Motivational cost aspects of physical education in middle school students

By: Xihe Zhu and Ang Chen

Zhu, X., & Chen, A. (2013). Motivational cost aspects of physical education in middle school students. *Educational Psychology, 33,* 465-481. doi:10.1080/01443410.2013.785043

This is an Accepted Manuscript of an article published by Taylor & Francis in *Educational Psychology* on 08 April 2013, available online: http://www.tandfonline.com/10.1080/01443410.2013.785043

Abstract:

Expectancy value theory presumes that learners' motivation is determined by their expectancy beliefs and task values associated with learning tasks. This study examined students' cost and its relation to expectancy beliefs, other task value components in physical education. Middle school students ($N = 593$) from 11 schools completed the expectancy-value questionnaire. Qualitative analysis of students' responses to open-ended questions showed motivational cost originated from curriculum content, instructional conditions/elements, physical discomfort, lack of social support and competence and teacher factors. Chi-square analysis suggests that students' motivational cost is associated with their hypothetical choices of attending physical education. Motivational cost was found to be negatively associated with other task value components, but not with expectancy beliefs.

Keywords: cost | expectancy belief | task value | motivation

Article:

Introduction

For a better understanding of learner motivation from the expectancy-value perspective, it is necessary not to only investigate positive functions from expectancy beliefs and task values but also to explore impact of factors that counter these functions (Eccles & Wigfield, 2002). Determining the function of cost, a unique component of task value articulated in the expectancy-value theory (Eccles, 1983; Wigfield & Eccles, 2000) affords us the opportunity to explore what might de-motivate students. A number of studies have provided much evidence about expectancy beliefs, attainment value, intrinsic value, utility value and their motivational functions in physical education (Chen & Liu, 2009; Chen, Martin, Ennis, & Sun, 2008; Goudas, Dermitzaki, & Bagiatis, 2001; Xiang, McBride, Guan, & Solmon, 2003; Xiang, McBride, & Bruene, 2004; Zhu & Chen, 2010) and other academic areas (Eccles, 1983; Fredricks & Eccles, 2002; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Simpkins, Davis-Kean, &

Eccles, 2006; Wigfield & Guthrie, 1997). However, the understanding about cost is limited due to the lack of empirical evidence, because most studies on the expectancy-value constructs did not include cost as a variable (Wigfield, Tonks, & Klauda, 2009). To further understanding about expectancy-value theory, we intended in this study to examine student cost aspect and its relation to expectancy beliefs, attainment value, intrinsic value and utility value in the domain of physical education.

Expectancy beliefs and task values

Motivation signifies what moves students and the direction of their move (Pintrich, 2003). There are multiple motivational theories existing in the realm of educational psychology (Alexander & Winne, 2006). In this study, we chose to focus on expectancy-value theory. The expectancy-value theory presumes that students' motivation is primarily determined by their expectancy beliefs and task values (Eccles, 1983; Eccles & Wigfield, 2002). Expectancy beliefs are defined as students' beliefs about how well they can perform on upcoming tasks/activities, either in short- or long-term future. Expectancy-beliefs are conceived of as broad beliefs about one's competence in a given domain. Task values represent the subjective perception of worth associated with the tasks/activities. According to Eccles (1983), task values are determined not only by the characteristics of the task itself, but also by the needs, goals and subjective valuation of the person. She elaborated that there are four value-laden components of the task: (a) the attainment value, (b) the intrinsic/interest value, (c) the utility value and (d) the cost.

Attainment value refers to the personal perceived importance of the doing well on the task (Eccles, 1983). Intrinsic value refers to the inherit enjoyment that the individual perceives while being engaged in the activity. It is determined by the perceived interest that the individual may derive in the activity. Utility value refers to the perceived usefulness of the task for the individual's current and future goals and agenda. Utility value itself might not be related to the nature of the task at hand, yet it relates directly to the individual's internalised immediate and future goals (Eccles, 1983). It was theorised and supported by empirical evidence that the attainment value, intrinsic value and utility value are positively related with expectancy beliefs. The last component, cost, represents the perceived negative perspectives associated with a task (Wigfield & Eccles, 2000). In other words, cost could *de-motivate* students for taking part in an activity, while expectancy beliefs and other task value components act as positive motivators.

Motivational cost

According to Eccles (1983), motivational cost derives from three primary sources: (a) perceived excessive effort associated with the task, (b) the perceived loss of time that could be used to accomplish other alternative activities and (c) psychological intolerance of potential failure of the task. Eccles (1983) believed that task values ought to be inversely related to cost assuming that individuals understand both the cost and the benefits of engaging in an activity. She assumed that individuals have a sense of how much effort that they think is worthwhile for various activities. As the amount of effort increases in relation to the amount of effort considered worthwhile, the task values should decrease. In other words, one perceives high cost when the demand for effort is high.

The second type of cost is perceived loss of time for other valued alternative tasks. It is also theorised as opportunity cost (cf. Buchanan, 1969). That is, the time that could have been used for alternative activities, and has been lost because of participating in one particular activity. In reality, students constantly face the temptation to carry out the alternative activities, thus reducing their motivation – a phenomenon described as motivational interference (Fries & Dietz, 2007). Even contemplating about meeting with friends while studying would cause an internal conflict for college students and thus could lead to incremental opportunity cost of learning (Grund & Fries, 2012).

A third type of cost includes negative effects due to unsuccessful experience in a task. Every achievement-related activity comes with a potential of failure. According to Eccles (1983), the potential failure encompasses negative psychological effects as well as avoidance behaviour choices. When students encountered potential failure, they most likely would choose to avoid the task, if they were provided with such an option (Eccles, 1983). School in many cases, however, is a restricted context not allowing such options to exist. Theorists (e.g. Covington & Beery, 1976; Nicholls, 1976) have suggested that in such a restricted context, students would exert necessary but minimal effort to just get through. They reasoned that this strategy has two advantages: first, it prevents complete failure; second, it provides a face-saving attribution for lack of success or ability. To maintain self-esteem, students tend to think the face-saving attribution cost less than the attribution to lack of ability to succeed.

Expectancy-value theory, achievement and behaviour choices

To foster a positive motivation experience for the learner, Alexander (2006) argued that educators should understand the nature of effort because learning requires extended effort and persistence. Previous studies have shown that expectancy beliefs and task values contribute to learning achievements and positive achievement-related choices (Eccles, 1983; Jacobs & Eccles, 2000). Specifically, expectancy beliefs have been identified to predict students' performances in various disciplines in schools, and task values (attainment, intrinsic and utility values) predict achievement-related behavioural choices. Particularly in physical education, student achievements are normally evaluated by his/her sport skill proficiency, conceptual knowledge and other affective aspects in physical activity participation (National Association for Sport and Physical Education [NASPE], 2004). Previous studies reported that students' expectancy beliefs were found to predict their engagement and running performance in physical education (Xiang et al., 2003, 2004). However, Zhu and Chen (2010) reported that expectancy beliefs and task values contributed little to student learning in fitness knowledge and fundamental psychomotor skills, as measured by the change in pre- and post-tests. Attainment, intrinsic, and utility values were reported to predict student effort (e.g. persistence) and future behavioural choices to participate in running programmes (Xiang et al., 2004) and after-school physical activities (Chen & Liu, 2009).

Cost, as an important component of the task values, has been theorised to have negative impact on achievement behaviour in education (Eccles, 1983). Anderson (2000) found that cost was significantly correlated with female students' other task values. Chen et al. (2008) reported that 69% of elementary-school students perceived four factors in physical education classes as cost to their motivation: undesirable curriculum content 68%, negative teacher behaviour 6%, negative

peer behaviour 14%, and physical discomfort 12%. Despite the cost, all elementary students in Chen et al.'s (2008) study responded that they would choose to attend physical education. The results of these studies have offered initial evidence on students' cost aspect and its relation to expectancy-value motivation and behaviour choices. Yet the inter-relation between students' cost, expectancy beliefs, task values, as well as behaviour choices remains unclear. Particularly for middle-school students, no known study has been reported on what constitutes cost to their motivation and whether or not the cost interacts with students' expectancy beliefs and other task value components in physical education.

The purpose of this study, therefore, was to explore middle-school students' motivational cost aspects of attending physical education and their relation to their expectancy beliefs, other task value components, and behavioural choices. Specifically, this study sought to address the following research questions: (a) what constitutes middle school students' motivational cost for attending physical education? (b) does students' motivational cost aspect relate to their expectancy beliefs and other task value components about physical education? and (c) does students' motivational cost associate with their choices in physical education? By addressing these questions, we believe the findings will deepen our understanding on students' cost aspect, and its function in motivation and behavioural choices in the domain of physical education.

Method

Participants

Because motivational cost has been under-researched with no specific quantitative measure available, we used an open-ended qualitative method for data collection. The participants were 593 (out of 854; 69.44%) middle school students who provided legible responses to the open-ended questions about cost aspects in expectancy-value questionnaire (EVQ). The other students (30.56%) wrote no response for the open-ended questions were not included in this study. The students were in sixth, seventh and eighth grades from a stratified sample of 11 schools from a large district in the US. Their mean age was 12.25 (SD = .99). Included in the sample, 48.74% of students are male and 51.26% are female. The sample included 14.3% Asian, 16.4% African American, 17.0% Hispanics, 43.5% Caucasian and 8.8% from other ethnic groups, representing a diverse population in the school district.

In order to test whether the participants of this study ($n = 593$) can still represent the original sample, a descriptive analysis on students' demographic variable ethnicity was conducted to compare with the original sample. Ethnicity was chosen as the auxiliary variable because the cost variables in the dataset were ordinal and thus could not be used to perform conventional missing value analysis (Rubin, 1987). As shown in Table 1, students who did provide responses to the open-ended questions were similar with the ethnic makeup of those who did not (dropout), suggesting that the missing values were not systematic. We also scanned through the dataset to ensure that the missing values were not from a single class/school. In addition, we compared students' expectancy beliefs and task values between students who provided responses and those who did not write any response using independent sample *t*-tests. The results showed no significant difference in expectancy beliefs or task values ($p \geqslant .10$) between those who provided responses to the open-ended questions and those who did not.

Table 1. Sample descriptors.

	Current sample (*n*)	Current sample %	Dropout sample %
Gender			
Female	304	51.26	51.72
Male	289	48.74	48.28
Ethnicity			
African American	97	16.40	19.80
Asian	85	14.30	12.80
Hispanic	101	17.00	18.10
White	258	43.50	41.50
Other	52	8.80	9.20
Grade			
Sixth	198	33.39	34.11
Seventh	200	33.73	32.95
Eighth	195	32.88	32.94
Total	593	100.00	100.00

Research context

The physical education curriculum implemented in the school district was skill-centred with a strong emphasis on standardised assessment, in consistent with the NASPE (2004) standards. On average, the middle-school students had 225 min of physical education each week, ranging from 200 to 245 min. The minutes were scheduled into ∼40 min daily lessons or ∼90 min lessons every other day (A/B day schedule). Sport-centred psychomotor skills, fitness concepts and physical activity dispositions were emphasised. Sport-centred psychomotor skills and strategies were instructed using a variety of methods including *Sport Education* and *Tactical Games*. Fitness concepts and physical activity principles were either organised in independent units or integrated into sport-related content. Because the curriculum emphasised evidence-based teaching and learning, assessment became an important component of the curriculum. The explicit standards from NASPE (2004) were used in the assessment to evaluate students' fitness knowledge, psychomotor learning, and psychological dispositions.

Variables and measures

Expectancy beliefs and task values

In this study, we used EVQ (Eccles & Wigfield, 1995) to measure students' expectancy beliefs and task values about physical education. Expectancy beliefs were measured using the first five questions and task values using the following six questions using a five-point Likert scale (with 5 = 'very important', and 1 = 'not important'). An example question that measures students' attainment value follows: 'Compare to maths, reading, and science, how important is it for you to learn physical education (PE) content?' Students were allowed to choose only one of the five choices. Zhu and Chen (2010) reported Cronbach's alpha for expectancy beliefs and task values ranging from .66 to .89 for middle-school students. Studies by Zhu, Sun, Chen, and Ennis (2012) reported its construct validity and reliability among middle school students in that the measurement model of EVQ was preserved very well among 903 sixth, seventh, and eighth

grade students from 13 middle schools with a latent structural reliability coefficient *Rho* (ρ) = .906. These studies suggested that EVQ can be used to measure the expectancy beliefs and task values of middle-school students in physical education. In this study, Cronbach's alpha values for expectancy beliefs, attainment value, intrinsic value, and utility value were calculated to be .83, .75, .88, and .84, respectively.

Cost and behavioural choices

Cost represents the perceived negative perspectives associated with participating in activities (Eccles, 1983). Question 12 in EVQ is an open-ended question that asked students whether or not there was anything that they did not like in physical education and why they did not like it. In responding to the question, students were asked to describe the negative aspects that they perceived when attending physical education (i.e. the cost to their motivation), as well as the potential sources that led to the negative perception. When students addressed why they perceived the negative aspects of physical education, their answers could reveal whether excessive effort, negative psychological meaning and/or other sources of cost existed in physical education.

For question 13, students were asked whether or not they were still going to choose to attend physical education if they were given an opportunity to choose not to, and why. Question 13 presented a hypothetical choice because physical education was mandatory for middle-school students who in fact did not have a choice. Nevertheless, the question gave the students a chance to articulate their hypothetical choices and whether there was perceived opportunity cost. That is, whether students thought the time spent in physical education should be used for other alternative tasks. When students answered that they would not choose to attend physical education and they would rather do some alternative tasks, opportunity cost was identified in the answers to question 13. These two open-ended questions were used to elicit students' cost aspects and potential behavioural choices based on the cost. Middle school students have acquired sufficient cognitive ability to process sophisticated questions, express their thoughts, and understand subtle nuances (Anfara, Mertens, & Caskey, 2007). Therefore, it was expected that the middle school students could understand and respond to these open-ended questions.

Data collection

The researchers and trained data collectors administered the EVQ. During data collection, students were required to sit apart and complete the questionnaire independently in gymnasia. Questions were read to the students during the data collection sessions and questions were immediately addressed. The EVQ was completed in the early spring semester 2009. All students participated in the data collection, but only the data from those students with parent consent to participate in the study were included in the dataset and analysed.

Data analysis

Qualitative analysis of student responses

Students' responses to the open-ended questions in EVQ were analysed using open coding approach to analysing a whole sentence or paragraph (Strauss & Corbin, 1998). First, for each question, students' responses of 'yes' and 'no' were counted. Second, when coding a sentence or paragraph students wrote, the data analyst asked, 'what is the major idea the student brought out in this sentence or paragraph in the context?' Then a code (i.e. a short name) was given to the sentence or paragraph and entered in a new string variable. Next, the codes in the new string variable were reassembled (e.g. 'sweating' and 'muscle pain') and grouped into broader categories (e.g. 'physical discomfort'). This approach, according to Strauss and Corbin (1998), is 'especially useful when the researcher already has several categories and wants to code specifically in relation to them' (p. 120). In general, students' written responses were very short, ranging from one to 23 words. There were a few long sentences that sometime brought another reviewer for help. We qualitatively coded students' responses for both open-ended questions in relation to Eccle's theorization and summarised the categories and themes in relation to motivational cost (Section 3.1.).

Then, based upon Chen and Liu (2009)'s categorization and Eccles (1983) theorization as a framework, two data analysts used the above open coding approach coded all students' responses. For example, one student responded: 'Yes. My muscles get hurt after exercise.' In coding this response, the analyst first counted the response as 'Yes'. Then the sentence following 'Yes' was coded as 'muscle hurt' and entered into a string variable. Finally, 'muscle hurt' along with other codes such as 'sweat, uncomfortable' was assembled as a broader category 'physical discomfort.' The open codes and category examples were summarised in Table 2. We then quantitatively analysed the categories in relation to expectancy beliefs, other task value components, as well as students' achievements in physical education (Section 3.2.).

To ensure reliability and trustworthiness of the coding process, the codes were entered into the string variable only when both analysts agreed on them (e.g. 'muscle hurt' as in the above example: 'My muscles get hurt after exercise.'). In case the two data analysts could not agree upon the code name for a student's response, a third external reviewer was brought into read the response and assign it to one of the two codes provided by the two analysts. Then the open code that won two analysts' support was retained and entered into the string variable for further analysis. Overall, only 33 responses for question 12 and 22 for question 13 needed the third external reviewer for open coding. The calculated inter-rater agreements on open code level (Cohen's κ) were .93 (SE = .01, $p < .01$), and .95 (SE = .01, $p < .01$) respectively.

Results

Cost aspects

As shown in Table 3, the results showed that 70.3% of the 593 middle-school students reported negative aspects of attending physical education as cost. The students (29.7%) who reported no cost (i.e. no perceived negative aspect) indicated that they liked everything in physical education.

Table 2. Sample responses to open-ended questions and codes.

Question # 12: If there is anything that you do not like in PE, what would that be? Why?		
Students' response	Category	Code
None/nothing/I like everything in PE	No cost	1
Do not like certain sports/volleyball/soccer…	Curriculum content	0
Do not like fitness activities/running/weight…		
Doing sports I am not good at		
Exercises boring/pointless/hard		
Doing/learning nothing in PE		
Doing surveys/written work		
Class is too short/long	Instructional conditions/elements	0
Exercise inside/outside		
No/limited choice		
Dressing/changing clothes		
Evaluation/fitness testing/mile run		
No supportive children/cheating/laughing at you	Lack of social support and competence	0
No friends with me		
Children talking too much/disruptive		
People won't share equipment		
Exercise makes me out of breath	Physical discomfort	0
Muscle pain/sweat/uncomfortable		
Cold/hot weather makes it uncomfortable		
Teacher treats students unfair/rudely	Teacher factor	0
Teacher does not teach		
Teacher force you do something you do not like /couldn't do		
Teacher yells at students		
Note 1. No perceived cost; 0. Perceived cost aspect.		
Question # 13: If you had a choice, would you rather not come to PE? Why?		
No, I would love come to PE	Attend PE without giving specific reason	1
It is required/break from academics	Academic grade/requirement	1
PE is fun/I love sports	Motivation for physical education	1
Help me stronger/fit/in shape/lose weight/spend my energy	Utility/benefits of physical activity	1
I would not come to PE	Not attend PE without giving specific reason	2
I do a lot of activities after-school, no need more	Enough activity	2
I would not come, it is not fun/boring/useless/difficult	Content too difficult/boring/not useful	2
I already know how to do/would take a different class	Opportunity cost	2
The teacher is rude/mean/unfair	Teacher	2
Rather play sports elsewhere	Instructional condition	2
Yes/No. It would depend what I could do if I didn't come/what activity is offered.	It depends	3
I'm not sure, PE is fun but my other classes are more important	Not sure	3

Note: 1. Attend PE; 2. Not attend PE; 3. It depends/Not sure.

For example, Mike[1] (male eighth grader, average) responded that 'No. I like everything in PE, nothing is wrong that we have fun playing activities.' Subsequently, Mike reported no motivational cost for attending PE, responded to the second question with 'I would always want to attend PE.' However, as summarised in Table 3 and 70.3% of the students responded with some cost aspects of attending physical education. The qualitative analysis on these responses of the negative perspective of physical education revealed five broad categories: curriculum content, instructional conditions/elements, lack of social support and competence, physical discomfort, and teacher factor.

Curriculum content

One major source (42%) of students' motivational cost came from the curriculum content, particularly the types of physical activity being offered in physical education. For instance, Natalie (female sixth grader, below average) wrote 'Running the mile is not very fun, and neither is the weight room' and Jose (male eighth grader, average) wrote 'I don't like volleyball. It's boring' For Natalie and Jose, they found the physical activities not interesting to them mainly because they thought the activity was not fun. In another words, their motivational cost could come from the curriculum content.

Table 3. Frequencies of cost aspects (perceived negative aspects) of physical education.

Cost	Code	Frequency	Percent (%)	Total (%)
No cost	Like everything in physical education	176	29.7	29.7
Perceived cost	Curriculum content	249	42	70.3
	Instructional conditions/elements	111	18.7	
	Lack of social support/competence	31	5.2	
	Physical discomfort	5	.8	
	Teacher factor	21	3.5	

Instructional conditions/elements

Another important source (18.7%) for students' motivational cost was from the physical education instructional conditions/elements. For example, physical/fitness testing became a cost aspect in physical education. Tim (male seventh grader, average) wrote 'I hate having tests in PE because it's supposed to be an elective. Also you're supposed to learn in PE by doing things, not having someone tell you and then have a test. We should be graded on participation.' Similarly, Myra (female seventh grader, low) wrote 'I don't like the mile run test.' Some wrote the class was to short or too long. Others did not want to change for physical education or did not like to exercise inside or outside. Overall, the special instructional conditions/elements of physical education became the source of the students motivational cost.

Physical discomfort

A unique source of students' motivational source for attending physical education was the physical discomfort associated with exercises and the weather occasionally; even though there was only small percentage of students (5.2%) wrote about it. For instance, Steven (sixth grader,

[1] All names are pseudonyms.

above average) thought muscle pain was the only negative aspect for him when attending physical education classes; he explained 'I love PE except my muscles hurt after exercise.' Other students mentioned uncomfortable situations of breathing, sweat, and exercising in cold/hot weather as their source of cost. Eccles's (1983) excessive efforts could be linked to the physical comfort associated with the activities in physical education in that for some students it does need a constant effort to withstand the ongoing discomfort.

When we read students' responses for the second open-ended question, we found that most students who perceived motivational cost that is derived from curriculum content, instructional conditions/elements, and physical comfort were still willing to attend physical education even if they were provided with an option not to. Steven, for example, wrote that 'I would come, because I think it is a great way to stay fit and learn to do exercises that are useful.' For Steven, even though he had to stand the discomfort of muscle pain, he valued exercises because they help him stay fit. Tim would choose to attend 'because it's fun and easy to do, also it's healthy.' Natalie, on the other hand, would come to physical education too, but for a different reason: 'because it is sort of like recess.' For Jose, whether to choose to attend physical education or not became conditional. If the perceived cost is too high, Jose would rather not take physical education. He wrote 'I would not come if we had to do the mile run.'

Lack of social support and competence

A small percentage of students (.8%) reported social support as a cost in their responses. Social support appears to be linked with the psychological meaning of perceived embarrassment and potential failure. For example, John (male seventh grader, above average) thought that there was a cost to his motivation in physical education when his peers were not supportive; he wrote 'I don't like other people watching and getting mad when I do things wrong.' Some also perceived cost as a result of the embarrassment due to lack of competence. Nyomie (female eighth grader, below average) wrote 'you feel embarrassed when you can't keep up with other kids, and even though you tried you still get a C.' The perceived embarrassment undoubtedly deterred Nyomie from choosing to attend physical education; she wrote 'I would rather not come, I am not good at sports, do not enjoy playing them and never will. I would rather take another subject of my choice.' The psychological meaning of potential failure resulted from social support, however, did not seem to influence John' choice to attend physical education; he wrote 'I would come to PE because I don't usually have to write stuff.' For John, the fact that his physical education classes did not involve much writing task made up to the cost of social support.

Teacher factor

Another small percentage (3.5%) of cost results from the teacher factor. For instance, Hao (male eighth grader, above average) wrote 'We always do the same stuff. He [the teacher] teaches nothing new.' Others wrote that the teacher sometimes was rude or not fair. Sandy (female, sixth grader, average) wrote 'I don't like the teacher yell at us.' For the subsequent question, Hao wrote 'Probably not [choose to attend physical education], because I hate being taught to do something I already know how to do.' He thought that he already knew the content being taught in his physical education classes, thus attending physical education cost him the opportunity to learn something new. Hao clearly named opportunity cost in his response to the second question.

The opportunity cost only was identified from students' responses to question 13 that was related to their hypothetical choices of attending physical education. This is consistent with the definition of opportunity cost. When the opportunity cost was perceived and named by a student, the student normally chose not to attend physical education if she/he was provided with such option, just like Hao mentioned in his response.

In summary, through analysing students' responses to the open-ended questions, it is evident that students' some cost aspects might be related with their intentions to attend physical education, although the impact may vary among the different cost types. It is still not known, however, whether or not the motivational cost aspects associate with students' expectancy beliefs, and other task value components in physical education.

Task values, expectancy beliefs, and behaviour choices

According to Chen and Liu (2009), two strong thematic categories can emerge from analysing student responses to the open-ended questions in EVQ: student perceived negative aspects of physical education (e.g. disliking), and hypothetical choices to continue physical education (e.g. choice decision/opportunity cost). Student perceived negative aspects of physical education can uncover student motivational cost aspects. Student hypothetical choices can disclose student valuation and decision-making process in the face of cost. Students' responses to the open-ended questions were first open coded (Table 2) and then summarised in a tabular format (see Tables 3 and 4). As displayed in Table 3, the perceived motivational cost came from many aspects. The leading three including curriculum content 42%, instructional conditions/elements 18.7%, and social support 5.2%. As demonstrated in Table 4, even though 70.3% of students perceived cost, 84% of them still would choose to attend physical education, 11% chose not to and 5.1% not sure or depending on other factors. The top three groups of students chose to attend physical education because of a strong motivation for physical education (31.2%), benefits of physical activities (25%) and for no specific reported reason (23.9%).

Table 4. Frequencies of hypothetical choices to attend physical education (PE).

Decision	Code	Frequency	Percent	Total (%)
Attend PE	Attend PE with no reason	142	23.9	84.0
	Academic requirement	23	3.9	
	Motivation	185	31.2	
	Benefits of physical activities in PE	148	25.0	
Not attend PE	Not attend PE with no reason	7	1.2	11.0
	Have enough physical activity	13	2.2	
	Curriculum content difficult/boring/not useful	31	5.2	
	Do not like the teacher	3	.5	
	Instructional condition	11	1.9	
It depends/ Not sure	It depends/Not sure	30	5.1	5.1

Cost and hypothetical choice

Qualitative data analysis of students' responses to the open-ended questions showed that students' cost aspects might be associated with their hypothetical choice of attending physical education classes. After students' responses were open-coded, chi-square analysis was performed

(Tables 3 and 4) to test whether or not there was an association between cost aspects and subsequent hypothetical choices. The result of chi-square analysis revealed that the association between these two variables was statistically significant ($\chi^2 = 29.45$, $df = 15$, $p = .01$), suggesting students' cost aspects was associated with their hypothetical choices. Students who reported no motivational cost were more likely to choose to attend physical education class than those who did.

Cost, expectancy beliefs and other task values

In order to test whether students' motivational cost interacts with their expectancy beliefs and other task value components, a multivariate analysis of variance (MANOVA) was conducted to detect any possible difference among different cost aspects. Because the three leading perceived cost aspects, no cost, curriculum content, and instructional conditions/elements, were identified among more than 90% of the students, these cost aspects were used as grouping variables in multi-group comparisons. Table 5 shows the descriptive statistics of students' expectancy beliefs and task values in these three groups. The results of Box' M test suggested a possible violation of multivariate normality assumption in achievement measures (Box' $M = 61.50$, $F = 3.31$, $p = .00$). Therefore, Pillai's Trace value was used in MANOVA. The results of MANOVA, Pillai's Trace = 5.44, $F = 5.44$, $p = .00$, $\eta^2 = .04$, suggest that there is a statistically significant effect of cost aspect on students' expectancy beliefs and other task value components in physical education.

Table 5. Results of Multiple Comparisons (Games-Howell) on Expectancy Beliefs and Task Vales.

Variable	Mean	SD	Group (I)	Group (J)	Mean (I–J)	SE	*p*
	4.18	.58	No cost	Content	.109	.062	.185
EB	4.07	.69	–	Conditions	.119	.076	.262
	4.06	.65	Content	Conditions	.009	.076	.991
	3.81	.79	No cost	Content	.334	.088	.001
AV	3.47	1.03	–	Conditions	.358	.112	.004
	3.45	1.00	Content	Conditions	.024	.115	.977
	4.31	.76	No cost	Content	.509	.089	.000
IV	3.80	1.07	–	Conditions	.601	.121	.000
	3.70	1.12	Content	Conditions	.099	.126	.715
	4.06	.84	No cost	Content	.313	.090	.002
UV	3.75	1.01	–	Conditions	.562	.121	.000
	3.50	1.09	Content	Conditions	.249	.121	.103

Note: SD = standard deviation; SE = standard error; EB = expectancy beliefs; AV = attainment value; IV = intrinsic value; UV = utility value; Content = curriculum content; Conditions = Instructional conditions/elements.

Because the variance homogeneity assumption was violated for *post hoc* comparisons ($p < .05$ in Levine's test), *Games–Howell* test was used for multiple comparison (Seaman, Levin, & Serlin, 1991). The results of multiple comparisons (Table 5) showed that there is no significant difference in students' expectancy beliefs among the three groups ($p > .05$). There are significant differences in students' other task value components (i.e. attainment value, intrinsic value and utility value) between no cost group and curriculum content ($p < .05$), and no cost and

instructional conditions/elements group ($p < .05$). Students who perceived no cost rated their task values significantly higher than those who perceived cost from curriculum content and instructional conditions/elements; however, no significant difference in task values was found between curriculum content and instructional conditions/elements group ($p > .05$). In summary, it appears that students' task values differed between no cost and cost groups, yet their expectancy beliefs do not.

Discussion

The purpose of this study was threefold: (a) to explore middle-school students' motivational cost aspects of physical education, (b) to examine the association between students' cost and expectancy beliefs, other task value components and (c) to identify possible association between students' cost aspects and behavioural choices in physical education. The results of qualitative data analysis revealed that middle-school students' cost aspects in physical education include five categories, primarily consisting of curriculum content, instructional conditions/elements, physical discomfort, lack of social support, and teacher factors. Further quantitative analysis (e.g. Chi-square) on the open-coded variables suggests that students' other task value components differed between no-cost and cost groups. However, no difference on expectancy beliefs was found between these groups.

Motivational cost

Cost represents the perceived negative perspectives for participating in a task (Eccles, 1983). In this study, 29.7% of the students reported no negative perspective for physical education, echoing that physical education is one of the most liked subjects in school (Goodlad, 2004). Majority of the students (70.3%) were able to identify the aspects that they perceived to be negative and constituted cost in physical education. The negative aspects were primarily derived from the curriculum content, instructional conditions/elements, lack of social support, physical discomfort and teacher factors. These findings were similar with Chen et al.'s (2008) study results in elementary students in that curriculum content, lack of support, physical discomfort and teacher factors were also reported by the middle school students. In particular, curriculum content was a major aspect of motivational cost in both studies for elementary and middle-school students, even though there was lower percentage of elementary students reporting motivational cost than the adolescents in this study. This consistent finding is not surprising given that the curriculum prescribes school learning experiences, and curriculum content can vary tremendously in physical education. While the instructional conditions/elements are sometimes challenging for the physical educators, educators can adjust their teaching of the curriculum content (Zhu, Ennis, & Chen, 2011). To alleviate the potential cost from curriculum content and instructional conditions/elements, not only should we place students in a comfortable physical learning context, but also attend to student interest in choosing curriculum content.

While it was difficult to estimate what motivational cost in physical education constituted excessive effort based on Eccles' (1983) conceptualization, students' perceived psychological meaning mainly emerged in this study. The lack of social support in physical education led to perceived embarrassment and unsupportive environment that can have a detrimental effect on students' intention of attending physical education classes. This finding is consistent with the

findings in previous studies (e.g. Ennis, 1999, 2000). Specifically, Ennis (1999) critiqued the traditional sport-based physical education where aggressive male players dominated the field, alienating the low-skilled girls and boys. She argued for and demonstrated an innovative curriculum that allowed second chances in physical education to promote student perception of success, ownership of the curriculum and a cooperative environment for boys and girls. From a motivational perspective, Ennis's (1999) curriculum approach serves as an encouraging model to lower the motivational cost of perceived failure and psychological meaning in physical education.

Not many students reported opportunity cost; but when reported, the opportunity cost seemed to derive primarily from two sources: the lost opportunities to have fun, and the lost opportunities to learn new skills/knowledge in physical education. This finding suggested that these students either perceived the curriculum as boring or insignificant in providing learning opportunities, and thus, they chose not to attend physical education and rather participate in other alternatives (Fries & Dietz, 2007). In either case, this finding can have important implications for the physical education curriculum development. Based on the previous reports (e.g. Zhu & Chen, 2010) where students' learning in basketball dribbling skill, for example, was small, it is likely that there was not enough depth for the particular content because students felt that they already knew 'how to do' the activities. When the sport skills and physical activity were taught as isolated entities, students were not able to see the meaning and implications of the skills tested beyond the immediate sport the skills are applied to. Instead of increasing the variety of physical activities/sport contents, physical education curriculum should focus on in-depth learning so that the content might be meaningful and fun for them (Lambert, 2004).

Impacts of motivational cost

Expectancy beliefs and task values have been theorised and tested to be positively correlated with one another (Wigfield & Eccles, 2000; Zhu et al., 2012). As a unique component of task value, cost is not significantly associated with expectancy beliefs, albeit significantly associated with attainment value, intrinsic value, and utility value. In this study, students who perceived no cost reported higher task values than those who perceived potential cost; however, no difference in expectancy beliefs was found between these groups. It might be that motivational cost derives from only the valuation of the task, but not directly or indirectly from cognitive appraisal of competency in a domain or task, which is imbedded in expectancy beliefs (Bong & Skaalvik, 2003).

In some cases, the motivational cost identified in this study could also be attributed to a lack of task values in particularly the curriculum content. The motivational cost impact in those cases was not as high to change their behavioural choices. For example, in Natalie's comments, 'Running the mile is not very fun, and neither is the weight room,' it might be an indication of her lacking of intrinsic value in running the mile and exercising in the weight room. Hence, the lowered attainment value, intrinsic value, and utility value in the presence of motivational cost would not necessarily result from the cost. It was also possible that the students had a little task value in the content because a lower cost impact would not necessarily create a higher task value for the content. The limited written responses from the open-ended questions would not allow for

further speculation. Future research should use in-depth interviews and systematic observations to distinguish whether it is the lack of task value or motivational cost.

As previous studies shown, task values tend to predict achievement-related choices and expectancy beliefs predict performances (Eccles & Wigfield, 2002; Xiang et al., 2004). The results of this study suggested that students' motivational cost aspects were related with their choices in answering a hypothetical question. Students who reported motivational cost for attending physical education were likely to choose to attend physical education than those who did not. Buchanan (1969) presumed that when people make decisions, not only do they consider the actual efforts of participating in an activity, but also consider the valuation and opportunity cost of the participation. Although the findings of this study provided evidence of the relation between cost aspects and hypothetical choices, how the actual decision was made in considering one's motivational cost is yet to be known and may require case-by-case analyses for each student. Whether the other task value components or expectancy beliefs mediate the relation between cost and achievement-related choices remains not clear in the study. More studies are needed to further explore these multilateral relations.

Limitations and future studies

The study explored student cost aspects, and their relation with expectancy beliefs, other task value components, and hypothetical choices in physical education. Two limitations should be noted. First, student cost aspects and hypothetical behavioural choices were elicited from written responses that may not be as rich compared with systematic observation and structured interviews. Second, it should be cautioned that students' responses may not necessarily represent their actual thoughts or behaviours; rather their responses might result from the questions that were presented to them (Nisbett & Wilson, 1977). Nevertheless, we believe the data provided a more complete picture of student motivation in physical education.

Recognising these limitations, we recommend future studies should use cognitive interview combining the advantages of both written responses and in-depth interviews to further describe and characterise student perceived cost in physical education and other education domains. Particularly, studies on the high repercussions of cost such as psychological meaning of potential failure and perceived opportunity cost are urgently needed as they are likely to be associated with negative behaviour choices such as class withdrawal and avoidance. When research on cost cumulates, it will become possible and meaningful to develop an instrument to measure motivational cost in physical education and to further our understanding of student motivation from expectancy-value perspective. Additionally, qualitative/ethnographic case studies examining student motivation, cost and decision-making process are equally important to allow for further empirical and theoretical discourses on cost aspects in relation to academic achievement and other motivation variables.

References

Alexander, P. A. (2006). *Psychology in learning and instruction*. Columbus, OH: Prentice-Hall.

Alexander, P. A., & Winne, P. H. (Eds.). (2006). *Handbook of educational psychology*. Mahwah, NJ: Lawrence Erlbaum Associates.

Anderson, P. N. (2000). Cost perception and the expectancy-value model of achievement motivation. Paper presented at the annual meeting American Educational Research Association, New Orleans, LA.

Anfara, V. A., Mertens, S. B., & Caskey, M. M. (Eds.). (2007). *The young adolescent and the middle school*. Charlotte, NC: Information Age.

Bong, M., & Skaalvik, E. (2003). Academic self-concept and self-efficacy: How different are they really? *Educational Psychology Review*, *15*, 1–40.

Buchanan, J. M. (1969). *Cost and choice: An inquiry in economic theory*. Chicago, IL: The University of Chicago Press.

Chen, A., & Liu, X. (2009). Task values, cost, and choice decisions in college physical education. *Journal of Teaching in Physical Education*, *28*, 192–213.

Chen, A., Martin, R., Ennis, C. D., & Sun, H. (2008). Content specificity of expectancy beliefs and task values in elementary physical education. *Research Quarterly for Exercise and Sport*, *79*(2), 195–208.

Covington, M. V., & Beery, R. G. (1976). *Self-worth and school learning*. New York, NY: Holt, Rinehatt and Winston.

Eccles, J. S. (1983). Expectations, values and academic behaviors. In: J. T. Spence (Ed.), *Achievement and achievement motivations* (pp. 75–146). San Francisco, CA: WH.

Eccles, J. S., & Wigfield, A. (1995). In the mind of the achiever: The structure of adolescents' academic achievement related-beliefs and self-perceptions. *Personality and Social Psychology Bulletin*, *21*, 215–225.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, *53*, 109–132.

Ennis, C. D. (1999). Creating a culturally relevant curriculum for disengaged girls. *Sport, Education, and Society*, *4*, 31–49.

Ennis, C. D. (2000). Canaries in the coal mine: Responding to disengaged students using theme-based curricula. *Quest*, *52*, 119–130.

Fredricks, J. A., & Eccles, J. S. (2002). Children's competence and value beliefs from childhood through adolescence: Growth trajectories in two male-sex-typed domains. *Developmental Psychology*, *38*, 519–533.

Fries, S., & Dietz, F. (2007). Learning in the face of temptation: The case of motivational interference. *Journal of Experimental Education*, *76*, 93–112.

Goodlad, J. I. (2004). *A place called school: Twentieth anniversary edition*. New York, NY: McGraw-Hill.

Goudas, M., Dermitzaki, I., & Bagiatis, K. (2001). Motivation in physical education is correlated with participation in sport after school. *Psychological Reports*, *88*, 491–496.

Grund, A., & Fries, S. (2012). Motivational interference in study-leisure conflicts: How opportunity costs affect the self-regulation of university students. *Educational Psychology*, *32*, 589–612.

Jacobs, J., & Eccles, J. S. (2000). Parents, task values, and real-life achievement-related choices. In: C. Samsone & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 405–439). San Diego, CA: Academic Press.

Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J. S., & Wigfield, A. (2002). Changes in children' self-competence and values: Gender and domain differences across grades one through twelve. *Child Development*, *73*, 509–527.

Lambert, L. T. (2004). Standards-based program design: Creating a congruent guide for student learning. In: S. J. Silverman & C. D. Ennis (Eds.), *Student learning in physical education: Applying research to enhance instruction* (pp. 129–146). Champaign, IL: Human Kinetics.

National Association for Sport and Physical Education [NASPE] (2004). *Moving into the future: National standards for physical education*. (2nd ed.). Reston, VA: Author.

National Center for Education Statistics [NCES]. (2003). *Characteristics of the 100 largest public elementary and secondary school districts in the United States: 2001–02*. US Department of Education: Institute of Education Sciences.

Nicholls, J. G. (1976). Behavior in virtuoso, but it's better to have ability: Evaluative responses to perception of effort and ability. *Journal of Research in Personality*, *10*, 306–315.

Nisbett, R., & Wilson, T. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, *84*, 231–259.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, *95*, 667–686.

Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys*. New York, NY: Wiley & Sons.

Seaman, M. A., Levin, J. R., & Serlin, R. C. (1991). New developments in pairwise multiple comparisons: Some powerful and practicable procedures. *Psychological Bulletin*, *110*, 577–586.

Simpkins, S. D., Davis-Kean, P. E., & Eccles, J. S. (2006). Math and Science motivation: A longitudinal examination of the links between choices and beliefs. *Developmental Psychology*, *42*, 70–83.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. (2nd ed.). Thousand Oaks, CA: Sage Publications.

Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology*, *25*, 68–81.

Wigfield, A., & Eccles, J. S. (2002). The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence. In: A. Wigfield, J. S. Eccles, & The Institute for Research on Women and Gender (Eds.), *Development of achievement motivation* (pp. 91–120). San Diego, CA: Academic Press.

Wigfield, A., & Guthrie, J. T. (1997). Relations of children's motivation for reading to the amount and breadth of their reading. *Journal of Educational Psychology*, *89*, 420–432.

Wigfield, A., Tonks, S., & Klauda, S. L. (2009). Expectancy-value theory. In: K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 55–75). New York, NY: Routledge.

Xiang, P., McBride, R., & Bruene, A. (2004). Fourth graders' motivation in an elementary physical education running program. *Elementary School Journal*, *104*, 253–266.

Xiang, P., McBride, R., Guan, J. M., & Solmon, M. (2003). Children's motivation in elementary physical education: An expectancy-value model of achievement choice. *Research Quarterly for Exercise and Sport*, *74*, 25–35.

Zhu, X., & Chen, A. (2010). Adolescent expectancy-value motivation and learning: A disconnected case in physical education. *Learning and Individual Differences*, *20*, 512–516.

Zhu, X., Ennis, C. D., & Chen, A. (2011). Implementation challenges for a constructivist physical education curriculum. *Physical Education and Sport Pedagogy*, *16*, 83–99.

Zhu, X., Sun, H., Chen, A., & Ennis, C. D. (2012). Measurement invariance of expectancy-value questionnaire in physical education. *Measurement in Physical Education and Exercise Sciences*, *16*, 41–54.